REMARKS

Applicants appreciate the Examiner's thorough examination of the subject application and request reconsideration of the subject application based on the foregoing amendments and the following remarks.

Claims 2-6, 10-13 and 38-43 are pending in the subject application.

Claims 1, 7-9, 14-37 and 44-59 were previously canceled. In this regard, Applicants would note that as to the claims that were withdrawn from prosecution, namely claims 28-30, 32-34, 36, 37 and 54-59 and previously canceled without prejudice; Applicants reserve the right to later present and continue prosecution of these claims in a continuing/divisional application.

Claims 3, 5, 10-13 and 38-43 are acknowledged as being allowable by the Examiner.

Claims 2, 4 and 6 stand rejected under 35 U.S.C. §102 and/or 35 U.S.C. §103.

Claim 6 was amended for clarity. Whilst lines 5-7 of claim 6 provide that the method controls the voltage being applied to the pixel electrodes in a conduction period of the pixel switching elements according to a pulse width supplied to the signal lines; Applicants amended the first wherein clause of claim 6 to clarify that the voltage being referred to in that clause was "in the conduction period of the pixel switching elements."

The amendments to the claims are supported by the originally filed disclosure.

35 U.S.C. §102 REJECTIONS

The Examiner rejected claim 6 under 35 U.S.C. §102(e) as being anticipated by Kikkawa [USP 6,577,295]. Applicants respectfully traverse.

Applicants claim, claim 6, a method for driving an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels. Such a method includes controlling a voltage applied to the pixel electrodes *in a conduction period of the pixel switching elements* according to a pulse width supplied to the signal lines, wherein, *in the conduction period of the switching elements,* the voltage applied to the pixel electrodes is less than a voltage supplied to the signal lines, and a maximum value of an amplitude of the voltage applied to the pixel electrodes is in a range of not less than 80 percent and not more than 98 percent of an amplitude of a voltage supplied to the signal lines.

The Office Action asserts that Kikkawa discloses the above-described invention with particular reference to the discussion in col. 3, lines 55-59 thereof. Applicants respectfully disagree with the characterization of what is being asserted as disclosed and taught in Kikkawa.

The specific language being referred to in Kikkawa is not of the invention of Kikkawa but rather concerns what Kikkawa considered as prior art. In order to understand the meaning of the cited passage and its relevance to the present invention it also is necessary to review the

discussion that precedes and follows the passage. An excerpt of the discussion from Kikkawa is provided below (col. 3, lines 43-65 thereof).

> Referring to FIG. 4 showing results of simulation, wherein a voltage of 5 volts is applied between the pixel electrode 17 and the common electrode 15, assuming that 480 scanning lines 13 are provided in the LCD device with a dot-inversion drive system wherein pixel electrodes in the adjacent pixels have opposite potential polarities with respect to the common electrode. Voltage Vg of the scanning lines 13 is 21 volts and -8 volts during an on-state and an off-state thereof, respectively, voltage Vd of the signal lines 14 is 12 volts and 2 volts during a positive voltage frame peirod and a negative voltage frame period, respectively, and voltage Vcom of the common electrode 15 is fixed at 6 volts.
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> *When the scanning line 13 is off,* voltage of the pixel electrode 17 falls below voltage Vd of the signal line 14 due to the charge in the TFT channel flowing into the pixel electrode 17 and to the coupling capacitance between the scanning line 13 and the pixel electrode 17. The voltage difference between the pixel electrode 17 and the signal line 14 is about 1 volt in the simulation, which causes the voltage difference between the pixel electrode 17 and the common electrode at 5 about volts. The black matrix 19 is disposed to cover the signal lines 14 and the scanning lines 13, and had an initial potential of zero volt.

As indicated in the part of the claim highlighted above in italics, the voltage control exercised according to the methodology of the present invention concerns *inter alia* controlling a voltage applied to the pixel electrodes *in a conduction period of the pixel switching elements*. In other words, what is being controlled is the voltage being applied to the pixel electrode when the switching element is in the ON state.

As also described in the subject application, a driving method of the present invention is a method of (i) controlling an applied voltage to pixel electrodes in a

conduction period of a pixel switching element according to a pulse wdith which is supplied to the signal lines (see pg. 31, lines 1-9 of the subject application), and (ii) increasing the supplied voltage to the signal line on the positive application, which process takes more time for charging, larger than the required voltage for the pixel (see pg. 33 lines 5-9 of the subject application), with the beneficial effect that the time constant of the pixel can be increased.

In contrast to the claimed method, Kikkawa (col. 3, lines 43-65 thereof) describes a case where the switching element is in the OFF state. Therefore, and in contrast to the method of claim 6, Kikkawa never discloses that *in a conduction period of the pixel switching element*, the voltage applied to each of the pixel electrodes is smaller than the voltage supplied to the signal line. See also pg. 31 line 1 to pg. 32, line 1, and pg. 33 lines 5-9 of the subject application. In sum, the language cited in support of the rejection does not describe, teach or suggest what happens during the conduction period of the switching element.

In addition, col. 3, lines 43-65 of Kikkawa does not include a description or discussion that explicitly discloses that the voltage applied to each of the pixel electrodes is smaller than the voltage supplied to the signal line in the conduction period of the switching element. In fact as indicated in the excerpt provided above, the voltage of the pixel electrode falls below the signal voltage Vd after the scanning line is off.

Kikkawa (see col. 4, lines 5-10), however, does describe that in the positive voltage frame, period, as shown in Fig. 4, voltage Vcom of the common electrode 15 is 6 volts and the voltage of the pixel electrode 17 is 11 volts. Referring now to Fig. 4 of Kikkawa it is illustrated that in the positive voltage frame period that: the voltage Vg (=21 V) of the scanning line 13 > the voltage Vd (=12 V) of the signal line 14 > the voltage (=11 V) of the pixel electrode 17 > the voltage (=6 V) of the common electrode 14 and in the negative voltage frame period: the voltage Vg (= – 8 V) of the scanning line 13 < the voltage (=1 V) of the pixel electrode 17 < the voltage Vd (=2 V) of the signal line 14 < the voltage (= 6 V) of the common electrode 14.

It also is asserted in the Office Action that the limitation "wherein a maximum value of an amplitude of the voltage applied to the pixel electrodes is in a range of not less than 80 percent and not more than 98 percent of an amplitude of a voltage supplied to the signal lines" is disclosed in cols. 3, lines 55-59 of Kikkawa. Applicants respectfully disagree with this characterization of what is being asserted as disclosed and taught in Kikkawa.

As indicated herein, the method of claim 6 provides that a maximum value of an *amplitude* of the voltage applied to the pixel electrodes is in a range of not less than 80 percent and not more than 98 percent of an amplitude of a voltage supplied to the signal lines. Such a charging rate is not a charging rate whose base point is set at 0V, but rather is a rate of (i) the potential the pixel has before starting the charging to (ii) the potential of

the signal line that is being charged. That is the charging rate represents the peak-to-peak voltage between the positive side and the negative side (see p. 33, line 21 through pg. 14, line 36 of the subject application).

In Kikkawa, however, the charging rate is 100%. In Kikkawa, the amplitude of the voltage supplied to the signal lines is 10 V (12 V – 2V = 10V) and the change of the voltage applied to the pixel electrodes is 10V (11 V- 1V = 10 V). In sum, Kikkawa cannot disclose, teach or suggest this feature of claim 6.

Furthermore, the claimed method of the present invention carries out pulse width modulation driving. In contrast to the presently claimed invention, Kikkawa describe carrying out voltage modulation or voltage variance driving. Thus, the methodology in Kikkawa cannot be altered without destroying the methodology inherently and explicitly embodied in the device disclosed therein.

As provided in MPEP-2131, a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Or stated another way, "The identical invention must be shown in as complete detail as is contained in the ... claims. *Richardson v Suziki Motor Co.*, 868 F.2d 1226, 9 USPQ 2d. 1913, 1920 (Fed. Cir. 1989). Although identify of terminology is not required, the elements must be arranged as required by the claim. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990). It is clear from the foregoing remarks that the above identified claims are not anticipated by Kikkawa.

In sum, Kikkawa does not disclose, as is claimed by Applicants:

> ... said method controlling a voltage applied to the pixel electrodes in a conduction period of the pixel switching elements according to a pulse width supplied to the signal lines,
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> wherein the voltage applied to the pixel electrodes is less than a voltage supplied to the signal lines, and
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> wherein a maximum value of an amplitude of the voltage applied to the pixel electrodes is in a range of not less than 80 percent and not more than 98 percent of an amplitude of a voltage supplied to the signal lines.

It is respectfully submitted that for the foregoing reasons, claim 6 is patentable over the cited reference and thus satisfies the requirements of 35 U.S.C. §102(e). As such, this claim is considered to be allowable.

35 U.S.C. §103 REJECTIONS

Claims 2 and 4 stand rejected under 35 U.S.C. §103 as being unpatentable over Kikkawa [USP 6,577,295] in view of Takabatake et al. [USP 5,430,460; "Takabatake"]. Applicants respectfully traverse.

As indicated in the discussion above regarding claim 6, Kikkawa does not disclose "said method controlling a voltage applied to the pixel electrodes in a conduction period of the pixel switching elements according to a pulse width supplied to the signal lines, wherein the voltage applied to the pixel electrodes is less than a voltage supplied to the signal lines." It is respectfully submitted that there also is no teaching or suggestion in Kikkawa as to such a

methodology. Further there is no teaching, suggestion or motivation offered in Kikkawa for modifying the methodology and image display device described therein so as to yield the methodology as claimed by Applicants.

As also indicated herein, the method of the present invention carries out pulse width modulation driving, whereas and in contrast to the present invention, Kikkawa describe carrying out voltage modulation or voltage variance driving. Thus, the methodology in Kikkawa cannot be altered without destroying the intended purpose and operation of the methodology embodied in the device disclosed therein.

As to Takabatake, this reference is used for the limited purpose, namely the alleged teaching regarding the maximum voltage applied to the pixel electrodes is different depending upon the polarity of the voltage being applied to the pixel electrodes (claim 2) or that the allocated time for a single scanning line is different for each polarity of the voltage applied to the pixel electrodes (claim 4). Thus, there is no teaching in Takabatake that overcomes the shortcoming identified above in the §102 discussion of claim 6. As such at least for this reason, claims 2 and 4 are distinguishable from the cited art.

Applicants also offer the following additional comments as to the disclosures and teachings of the references as applied to claims 2 and 4.

As to claim 2, Kikkawa does not describe or teach a structure in which the common electrode is provided on the second substrate. Specifically and in contrast to the claimed method;

Figures 2, 3 and 6 of Kikkawa show that the common electrode 15 is provided on the substrate on which the pixel electrodes 17, the scanning lines 13, the signal lines 14 are provided.

As to the secondary reference, reference is made in the Office Action to Fig, 1B in Takabatake and the polarity of Vgk to assert that there is motivation for combining Kikkawa and Takabatake and to assert that the combination yields the claimed method. Applicants respectfully disagree with this assertion(s).

Takabatake does not disclose the voltage that is being applied to the signal lines. In this regard, Applicants would note that Vgk is a voltage that is applied to a scanning line and not to a signal line.

Also, the waveform of V_D has omitted portions, so that it is impossible to say that the maximum value of V_D is changed according to the polarity of V_D even if the voltage supplied to the signal lines is constant. In particular, the voltage waveform of V_D in Takabatake is obtained by simply repeating a process of: (i) during a time interval of the first 1/n field, positive-polarity signals V_D are applied to pixels C_{LC11} and C_{LC12} connected to an group of odd scan lines Vgk and Vgk2+2, and negative-polarity signals V_D are applied to the pixels C_{LC21} and C_{LC22} connected to a group of even scan lines Vgk+1; and (ii) during the next 1/n field negative-polarity signals V_D are applied to pixels C_{LC11} and C_{LC12} connected to the odd scan lines Vgk and Vgk2+2, and positive-polarity signals V_D are applied to the pixels C_{LC21} and C_{LC22} connected to the even scan lines Vgk+1. Therefore, what is shown is that the polarity of V_D merely changes every field; however, the maximum voltage thereof never changes.

Thus, in Takabatake the positive-polarity signals and the negative-polarity signals are applied to the group of drain electrodes in such a manner that these positive-polarity and negative-polarity signals are shifted by the 1/n field, whereby the driving is carried out in such a manner that V_D and Vcom are inverted like alternated current at each field (see col. 3, lines 51-59 thereof). This indicates that the polarity of the other voltages to the pixel electrodes is reversed every field. Nonetheless, Takabatake still does not anywhere teach or suggest that the proportion of the maximum value of the voltage applied to the pixel electrodes with respect to the voltage supplied to the signal lines becomes different depending on the polarity of the voltage being applied to the pixel electrodes. Therefore, the features of claim 2 cannot be obtained even by combining the teachings of Kikkawa and Takabatake.

In sum, there is no description, teaching or suggestion anywhere in Takabatake that a proportion of the maximum value of the voltage applied to the pixel electrodes with respect to the voltage being supplied to the signal lines is different depending upon the polarity of the voltage applied to the pixel electrodes. Thus, it is respectfully submitted that the combination of Kikkawa and Takabatake would not yield the method of claim 2.

As to claim 4, it is asserted in the Office Action that Kikkawa discloses all the features described in claim 4, except that an allocated time for a single scanning line is different for each polarity of the voltage applied to the pixel electrodes. It is further asserted that the features of claim 4 can be obtained by combining the teachings of Kikkawa and Takabatake. Applicants respectfully disagree with this assertion(s).

The allocated time described in claim 4, refers to the voltage application time (*i.e.*, ON time of the switching element) for a single scanning line, which application time is different for each polarity of the voltage applied to the pixel electrodes. In other words, the positive voltage application time is different from the negative voltage application time. See also pg. 43, line 15 through pg. 45, line 1, in particular pg. 44, lines 20-21, of the subject application.

On the other hand, in Takabatake for example, during the time interval of the first 1/n field, the positive-voltage signals V_D are applied to the pixels C_{LC11} and C_{LC12} connected to the scan lines Vgk and during the next 1/n field the negative-polarity signals V_D are applied to pixels C_{LC11} and C_{LC12} connected to the scan lines Vgk. In other words, such a process is merely repeated in Takabatake.

It is respectfully submitted that the description and voltage waveform in Takabatake does not disclose, teach or suggest that the positive application time and the negative application time are different from each other in the scan lines Vgk. Furthermore, there are no numerical values provided on the waveform in Takabatake and also there is no comparison of the voltage waveform with other waveforms in Takabatake. Moreover, the minor difference in the voltage waveform and with the waveforms of the other scanning lines does not provide any teaching or suggestion that one skilled in the art could reasonably conclude that the positive application time and the negative application time are different from each other and that such a difference would be reasonably successful in solving the problem described in the subject application. Thus, it is

respectfully submitted that the combination of Kikkawa and Takabatake would not yield the method of claim 4.

The following additional remarks also shall apply to each of claim 2 and 4.

The Federal Circuit has indicated in connection with 35 U.S.C. §102 that in deciding the issue of anticipation, the trier of fact must identify the elements of the claims, determine their meaning in light of the specification and prosecution history, and identify *corresponding elements* disclosed in the allegedly anticipating reference (emphasis added, citations in support omitted). *Lindemann Maschinenfabrik GMBM v. American Hoist and Derrick Company et al.*, 730 F. 2d 1452, 221 USPQ 481,485 (Fed. Cir. 1984). Notwithstanding that the instant rejection is under 35 U.S.C. §103, in the present case the Examiner has not shown that phrase "maximum value of an amplitude of the voltage applied to the pixel electrodes is in a range of not less than 80 percent and not more than 98 percent of an amplitude of a voltage supplied to the signal lines" corresponds, as that term is used above by the Federal Circuit, in any fashion to any feature or characteristic of the liquid crystal display device described in Kikkawa as well as any method embodied in such a display.

As provided in MPEP 2143.01, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so <u>found</u> either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F. 2d 1071, 5